FIG.1

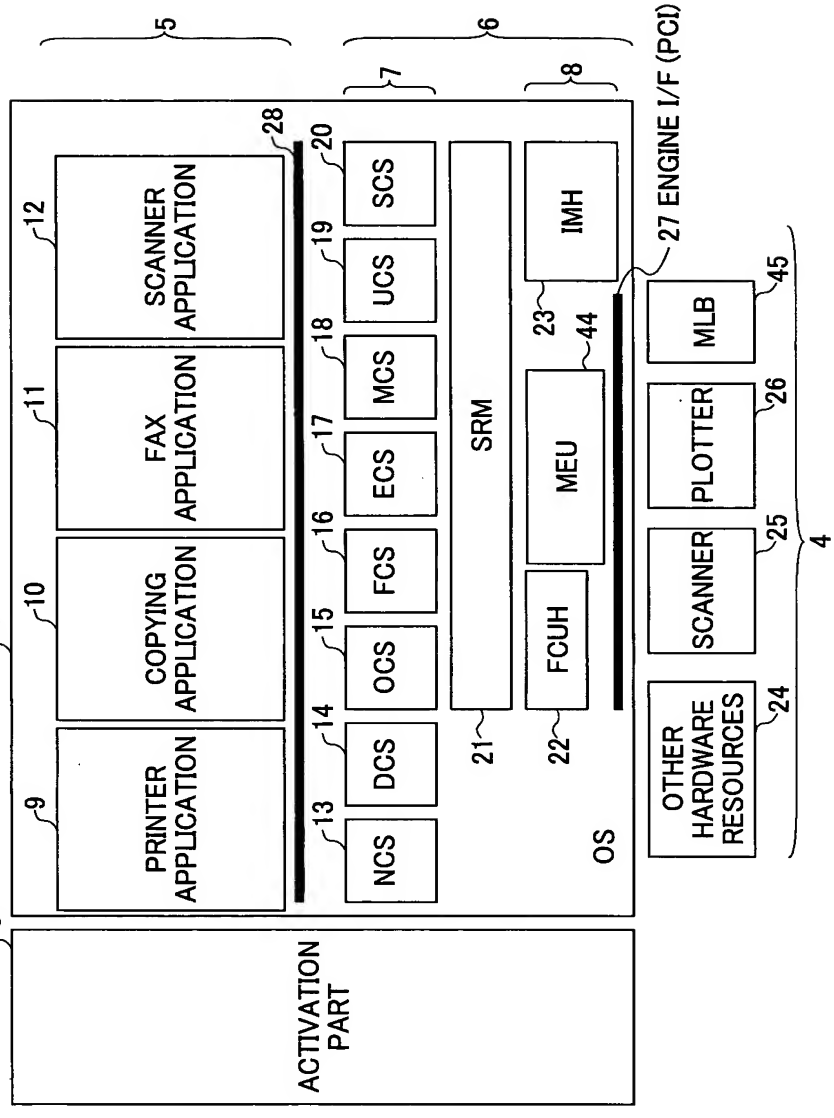

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27 ENGINE I/F (PCI)
28
ACTIVATION PART
PRINTER APPLICATION
COPYING APPLICATION
FAX APPLICATION
SCANNER APPLICATION
NCS
DCS
OCS
FCS
ECS
MCS
UCS
SCS
SRM
FCUH
MEU
IMH
OS
OTHER HARDWARE RESOURCES
SCANNER
PLOTTER
MLB
44
45

FIG.2

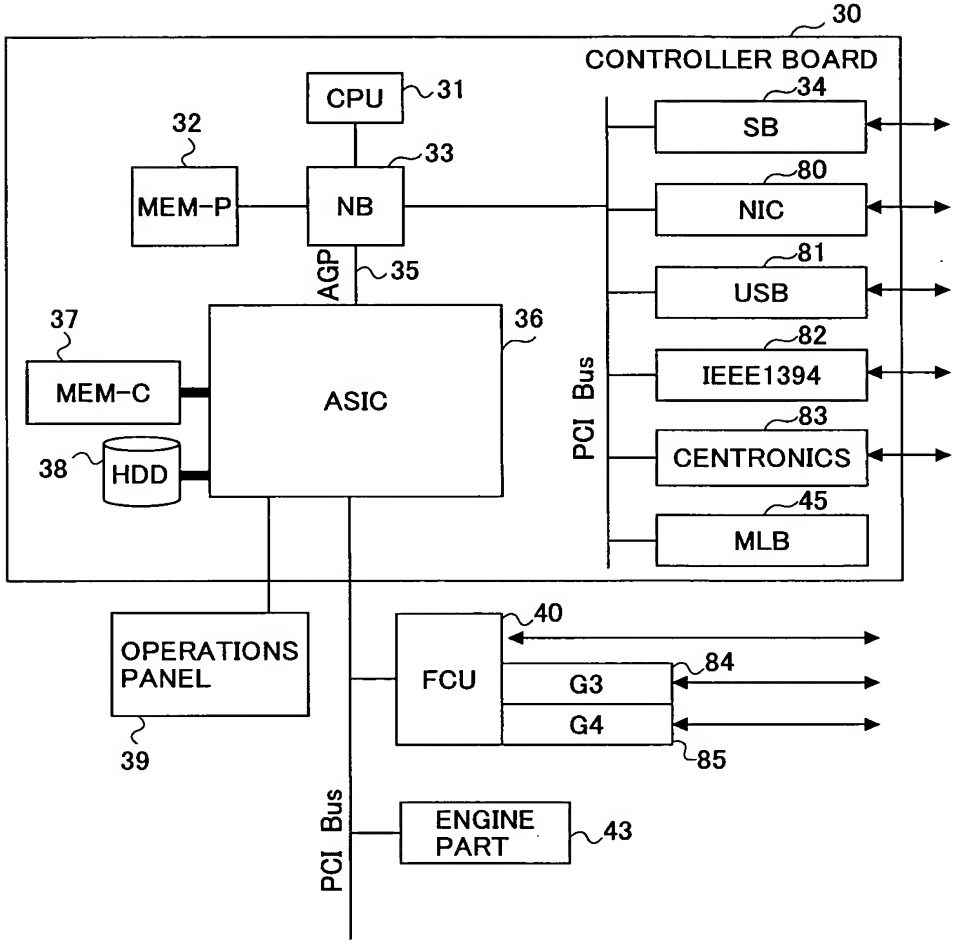

30
CONTROLLER BOARD
CPU
31
32
33
MEM-P
NB
AGP
35
37
36
MEM-C
ASIC
38
HDD
34
SB
80
NIC
81
USB
82
IEEE1394
83
CENTRONICS
45
MLB
PCI Bus
OPERATIONS PANEL
39
FCU
40
84
G3
G4
85
PCI Bus
ENGINE PART
43

FIG.3

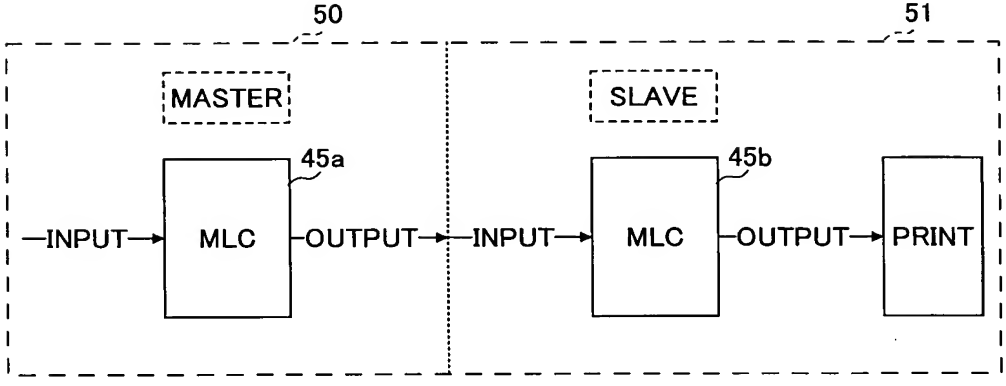

50
51
MASTER
SLAVE
45a
45b
INPUT
MLC
OUTPUT
INPUT
MLC
OUTPUT
PRINT

FIG.4

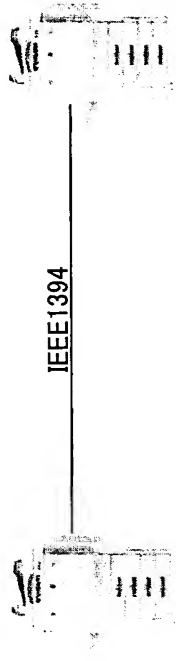


FIG.5

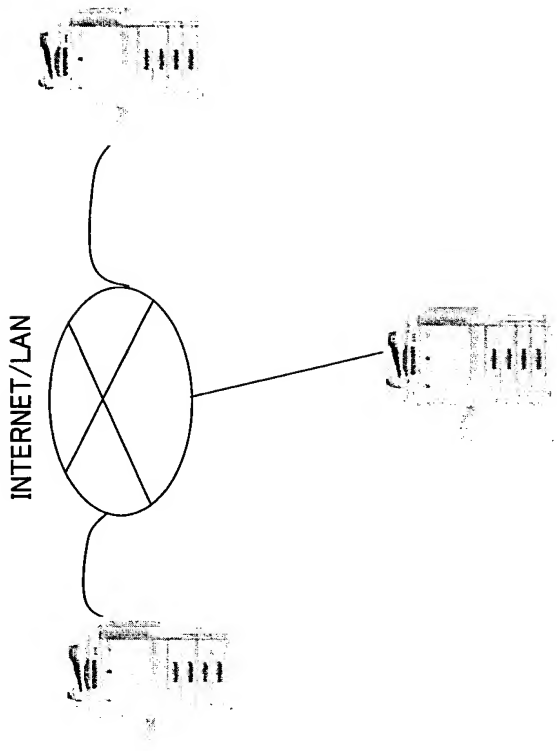


FIG.6

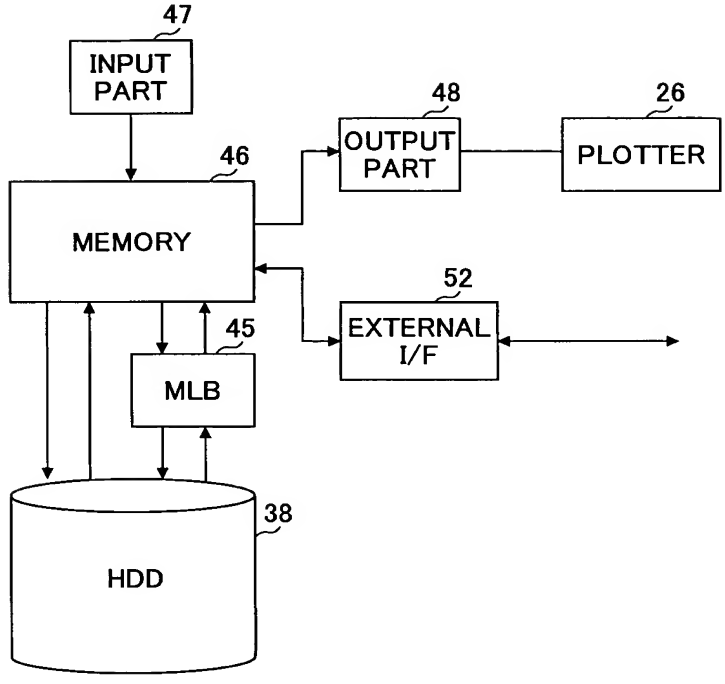

47
INPUT PART
48
OUTPUT PART
26
PLOTTER
46
MEMORY
52
EXTERNAL I/F
45
MLB
38
HDD

FIG.7

BINARY, QUATERNARY, OCTAL
MH／MR／MMR
JPEG
RGB
NFC1

FIG.8

BINARY, QUATERNARY, OCTAL
MH／MR／MMR
JPEG／JPEG2000
RGB／sRGB
TIFF

FIG.9

BINARY, QUATERNARY, OCTAL, MULTI-LEVEL
MH／MR／MMR
JPEG
NFC1
K4、K8
TIFF
RGB

FIG.10

BINARY, QUATERNARY, OCTAL
NFC1

FIG.11

BINARY, QUATERNARY, OCTAL
MH／MR／MMR
JPEG
NFC1

FIG.12

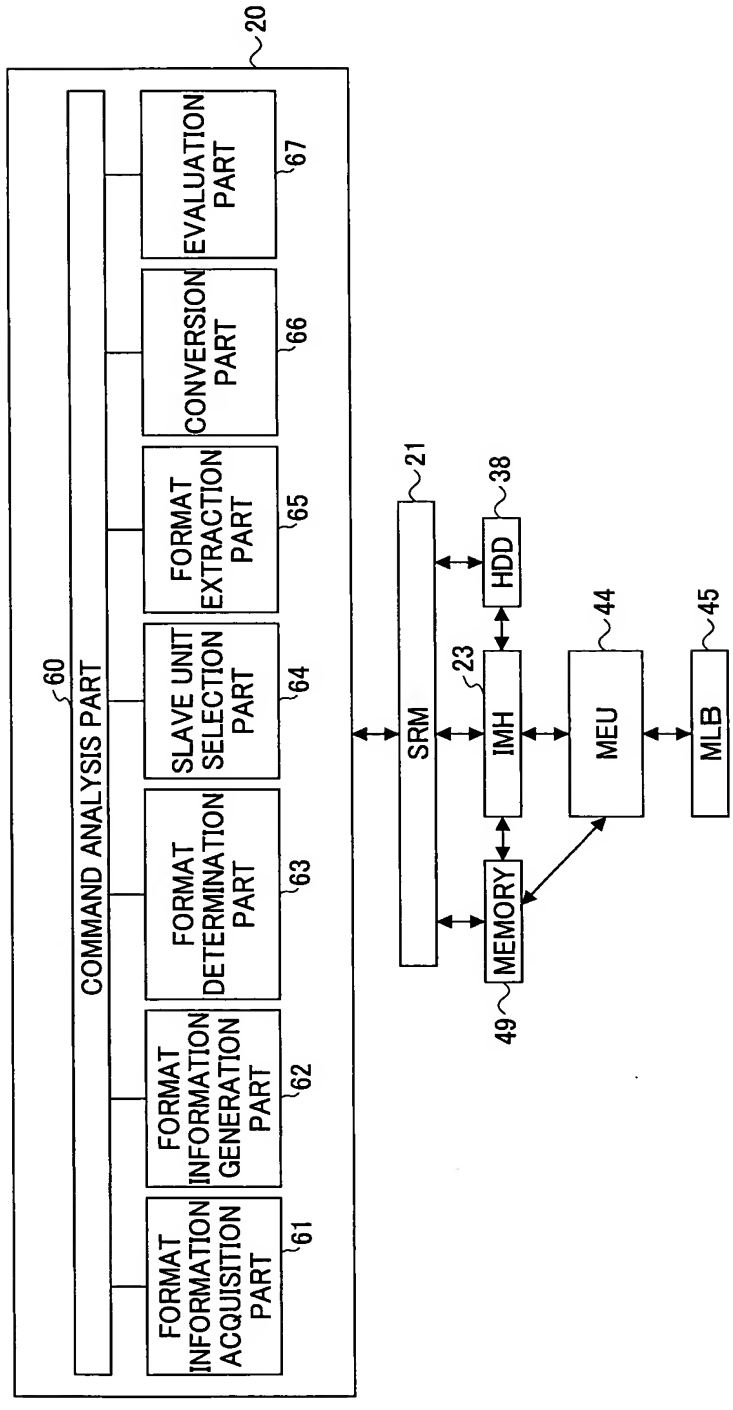

20
COMMAND ANALYSIS PART
60
FORMAT INFORMATION ACQUISITION PART
61
FORMAT INFORMATION GENERATION PART
62
FORMAT DETERMINATION PART
63
SLAVE UNIT SELECTION PART
64
FORMAT EXTRACTION PART
65
CONVERSION PART
66
EVALUATION PART
67
SRM
21
IMH
23
HDD
38
MEMORY
49
MEU
44
MLB
45

FIG.13

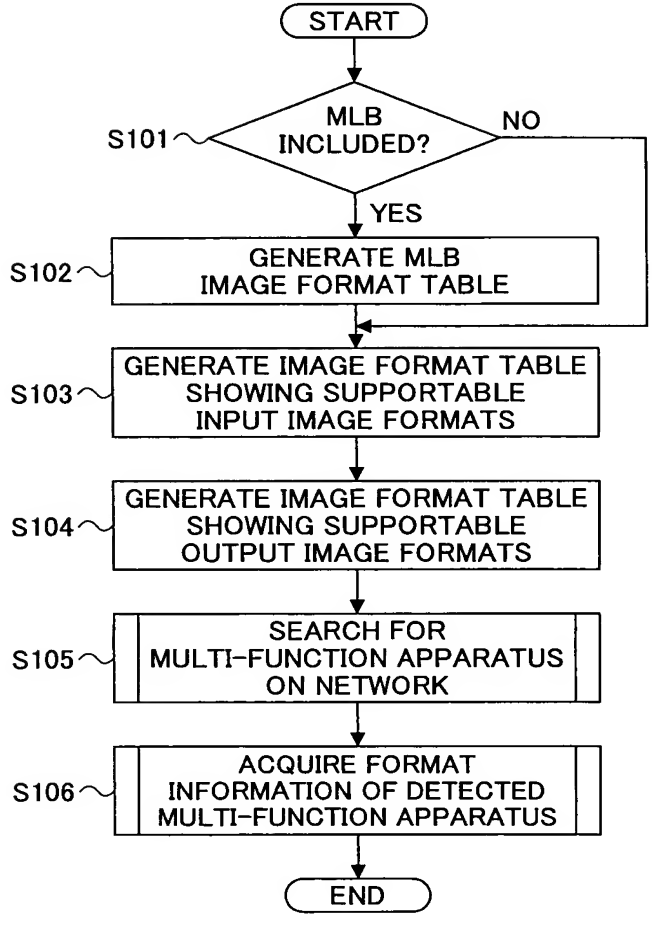

START
S101
MLB INCLUDED?
NO
YES
S102
GENERATE MLB IMAGE FORMAT TABLE
S103
GENERATE IMAGE FORMAT TABLE SHOWING SUPPORTABLE INPUT IMAGE FORMATS
S104
GENERATE IMAGE FORMAT TABLE SHOWING SUPPORTABLE OUTPUT IMAGE FORMATS
S105
SEARCH FOR MULTI-FUNCTION APPARATUS ON NETWORK
S106
ACQUIRE FORMAT INFORMATION OF DETECTED MULTI-FUNCTION APPARATUS
END

FIG.14

MLB IMAGE FORMAT							
		INPUT					
		FORMAT A	FORMAT B	FORMAT C	FORMAT D	...	FORMAT K
OUTPUT	FORMAT A	-	Y(0.9)	Z(0.8)	Z(0.7)	...	X
	FORMAT B	Z(0.4)	-	Y(0.7)	Y(0.8)	...	X
	FORMAT C	Z(0.5)	Y(0.8)	-	Z(0.9)	...	X
	FORMAT D	Z(0.6)	Z(0.7)	Z(0.8)	-	...	X
	...	...	...	...	...	...	...
	FORMAT K	X	X	X	X	X	X

FIG.15

IMAGE FORMAT (INPUT)	
FORMAT A	X
FORMAT B	Z
FORMAT C	Z
FORMAT D	X
...	...
FORMAT K	X

OBLON, SPIVAK, ET AL
DOCKET #: 244515US2
INV: Osamu KIZAKI, et al.
SHEET 11 OF 31

FIG.16

IMAGE FORMAT (OUTPUT)	
FORMAT A	X
FORMAT B	Z
FORMAT C	Z
FORMAT D	X
...	...
FORMAT K	X

FIG.17

MLB	YES

FIG.18

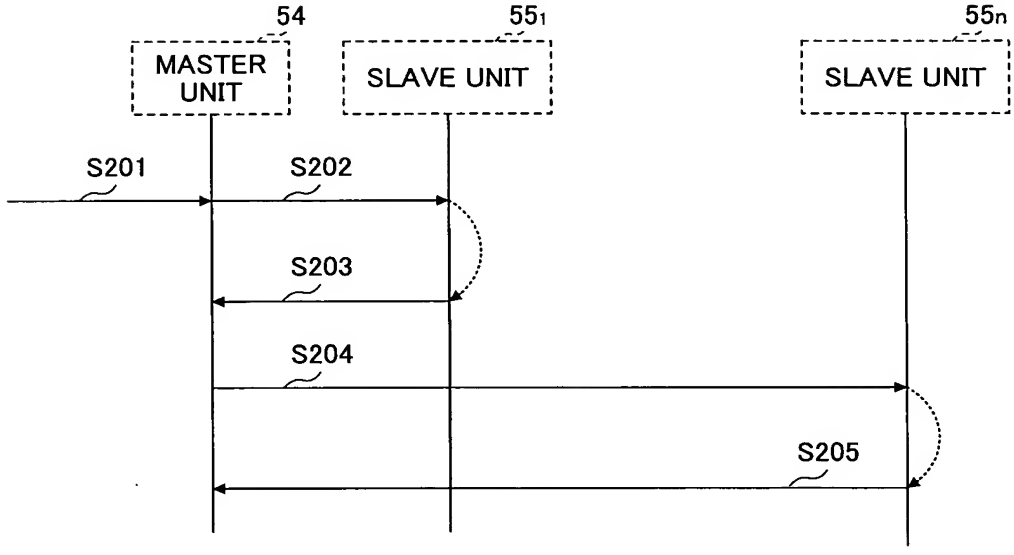

54
55₁
55n
MASTER UNIT
SLAVE UNIT
SLAVE UNIT
S201
S202
S203
S204
S205

FIG.19

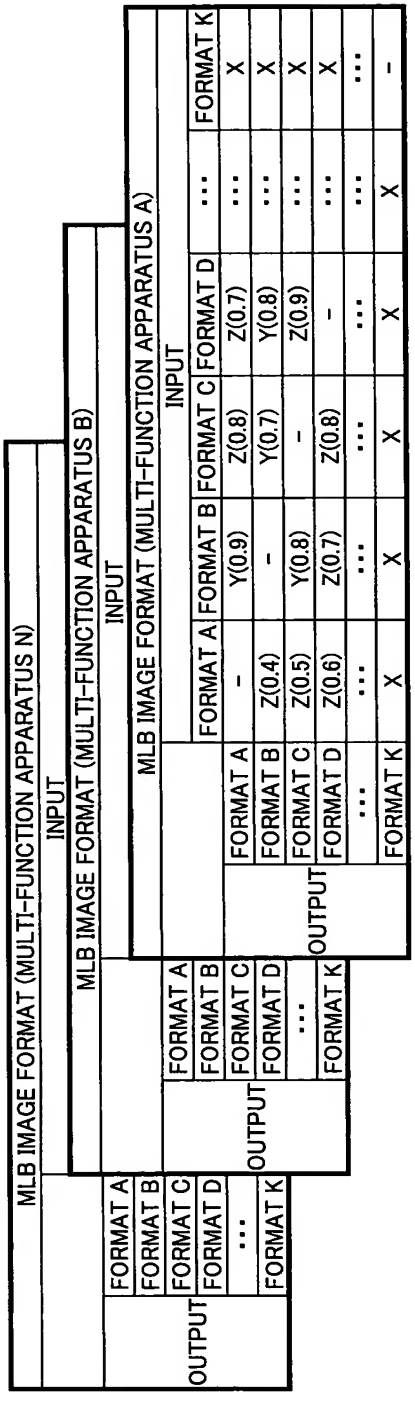

MLB IMAGE FORMAT (MULTI-FUNCTION APPARATUS N)
INPUT
MLB IMAGE FORMAT (MULTI-FUNCTION APPARATUS B)
INPUT
MLB IMAGE FORMAT (MULTI-FUNCTION APPARATUS A)
INPUT
OUTPUT
FORMAT A
FORMAT B
FORMAT C
FORMAT D
...
FORMAT K
OUTPUT
FORMAT A
FORMAT B
FORMAT C
FORMAT D
...
FORMAT K
OUTPUT
FORMAT A
FORMAT B
FORMAT C
FORMAT D
...
FORMAT K
FORMAT A
FORMAT B
FORMAT C
FORMAT D
...
FORMAT K
– Y(0.9) Z(0.8) Z(0.7) ... X
Z(0.4) – Y(0.7) Y(0.8) ... X
Z(0.5) Y(0.8) – Z(0.9) ... X
Z(0.6) Z(0.7) Z(0.8) – ... X
... ...
X X X X ... –

FIG.20

MLB INCLUSION					
	APPARATUS A	APPARATUS B	APPARATUS C		APPARATUS N
MLB	YES	NO	YES	...	YES

OBLON, SPIVAK, ET AL
DOCKET #: 244515US2
INV: Osamu KIZAKI, et al.
SHEET 15 OF 31

FIG.21

IMAGE FORMAT (INPUT)					
	APPARATUS A	APPARATUS B	APPARATUS C		APPARATUS N
FORMAT A	X	X	Z	...	Z
FORMAT B	Z	Z	Z	...	Z
FORMAT C	Z	X	Z	...	Z
FORMAT D	X	X	X	...	X
...	...	...	...	...	...
FORMAT K	X	X	X	...	X

FIG.22

IMAGE FORMAT (OUTPUT)					
	APPARATUS A	APPARATUS B	APPARATUS C		APPARATUS N
FORMAT A	X	X	Z	...	Z
FORMAT B	Z	Z	Z	...	Z
FORMAT C	Z	X	Z	...	Z
FORMAT D	X	X	X	...	X
...	...	...	...	...	
FORMAT K	X	X	X	...	X

OBLON, SPIVAK, ET AL
DOCKET #: 244515US2
INV: Osamu KIZAKI, et al.
SHEET 16 OF 31

FIG.23

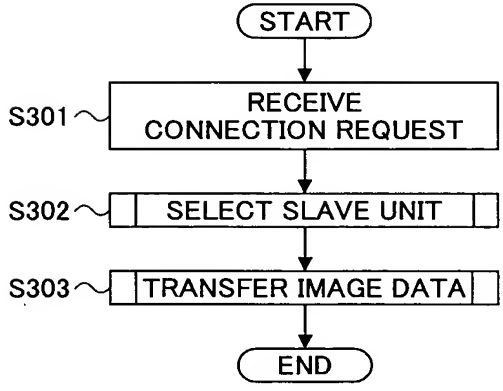

START
S301
RECEIVE CONNECTION REQUEST
S302
SELECT SLAVE UNIT
S303
TRANSFER IMAGE DATA
END

FIG.24

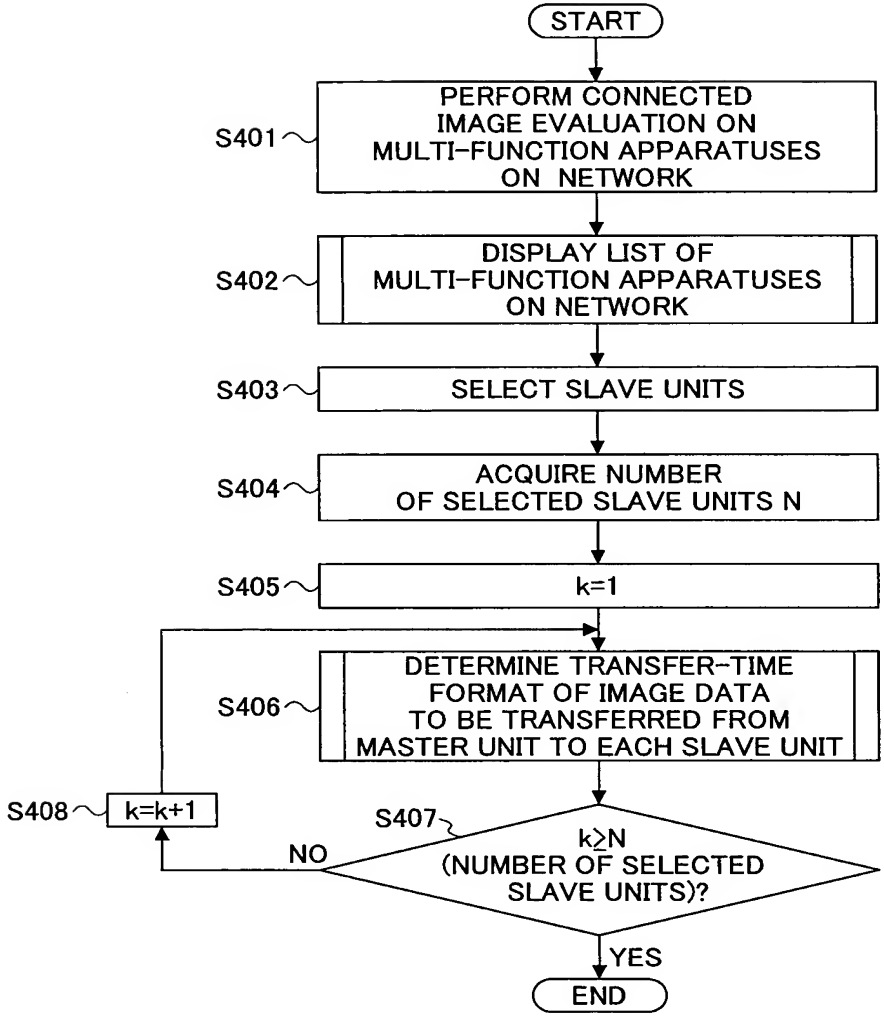

START
S401
PERFORM CONNECTED IMAGE EVALUATION ON MULTI-FUNCTION APPARATUSES ON NETWORK
S402
DISPLAY LIST OF MULTI-FUNCTION APPARATUSES ON NETWORK
S403
SELECT SLAVE UNITS
S404
ACQUIRE NUMBER OF SELECTED SLAVE UNITS N
S405
k=1
S406
DETERMINE TRANSFER-TIME FORMAT OF IMAGE DATA TO BE TRANSFERRED FROM MASTER UNIT TO EACH SLAVE UNIT
S407
k≥N (NUMBER OF SELECTED SLAVE UNITS)?
NO
S408
k=k+1
YES
END

FIG.25

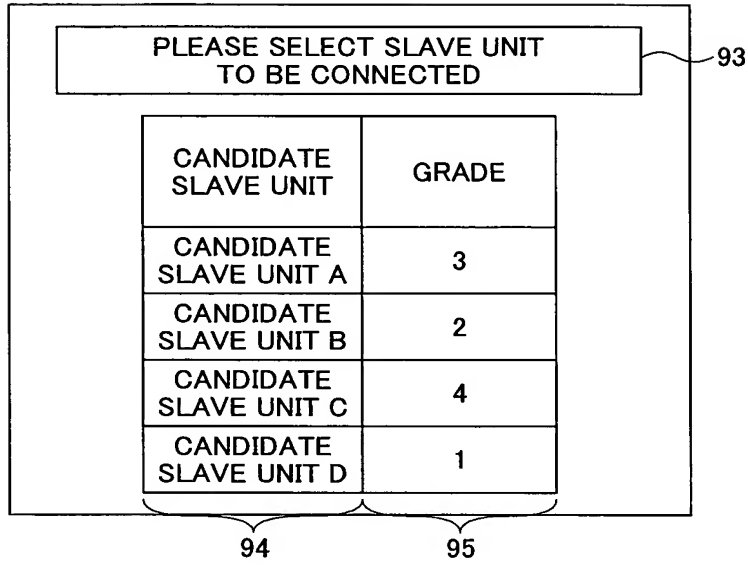

PLEASE SELECT SLAVE UNIT TO BE CONNECTED
93
CANDIDATE SLAVE UNIT
GRADE
CANDIDATE SLAVE UNIT A
3
CANDIDATE SLAVE UNIT B
2
CANDIDATE SLAVE UNIT C
4
CANDIDATE SLAVE UNIT D
1
94
95

FIG.26

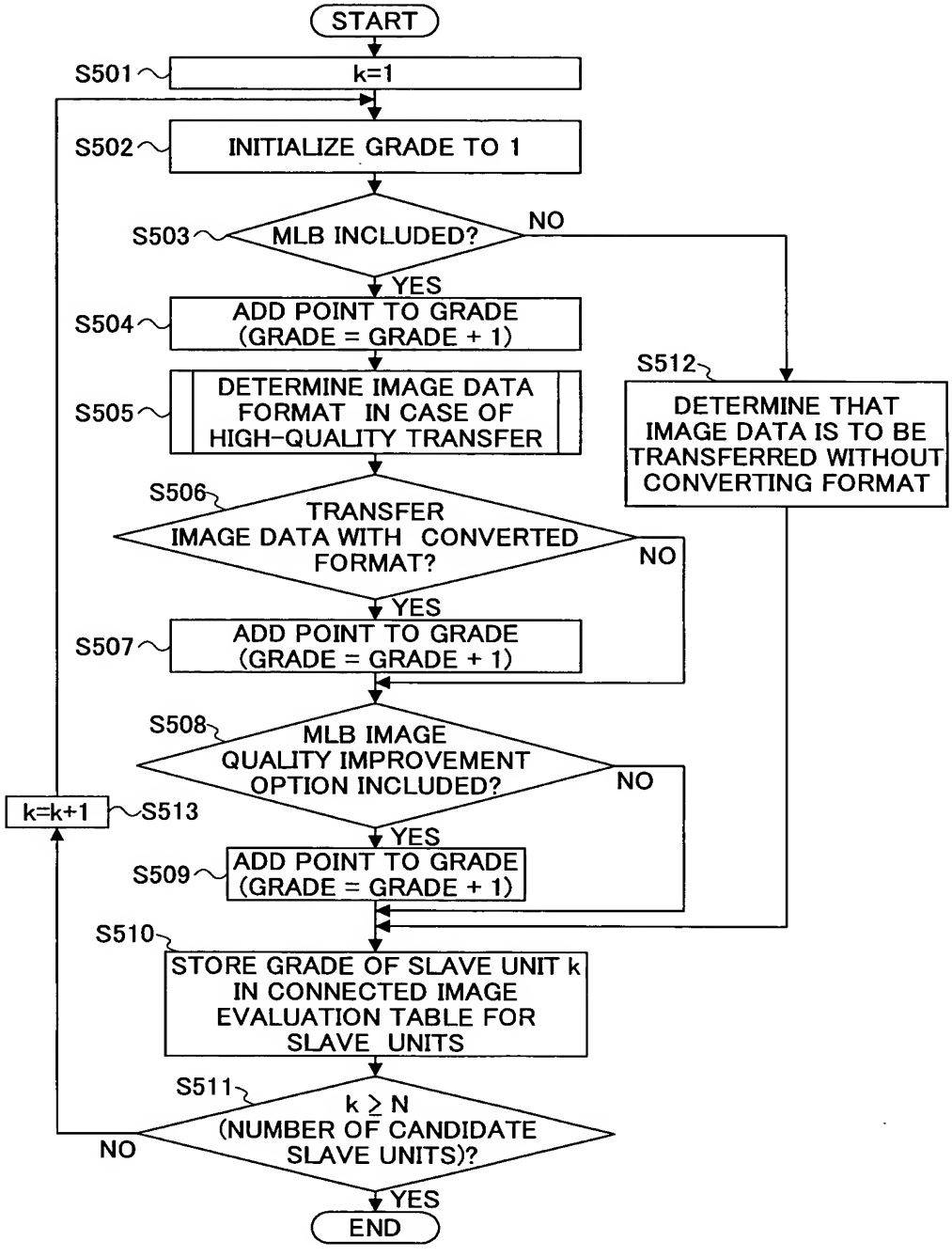

START
S501
k=1
S502
INITIALIZE GRADE TO 1
S503
MLB INCLUDED?
NO
YES
S504
ADD POINT TO GRADE (GRADE = GRADE + 1)
S505
DETERMINE IMAGE DATA FORMAT IN CASE OF HIGH-QUALITY TRANSFER
S506
TRANSFER IMAGE DATA WITH CONVERTED FORMAT?
NO
YES
S507
ADD POINT TO GRADE (GRADE = GRADE + 1)
S508
MLB IMAGE QUALITY IMPROVEMENT OPTION INCLUDED?
NO
YES
S509
ADD POINT TO GRADE (GRADE = GRADE + 1)
S512
DETERMINE THAT IMAGE DATA IS TO BE TRANSFERRED WITHOUT CONVERTING FORMAT
S510
STORE GRADE OF SLAVE UNIT k IN CONNECTED IMAGE EVALUATION TABLE FOR SLAVE UNITS
S511
k ≥ N (NUMBER OF CANDIDATE SLAVE UNITS)?
NO
YES
k=k+1
S513
END

FIG.27

CANDIDATE SLAVE UNIT	GRADE	BASIC	IMAGE QUALITY IMPROVEMENT OPTION OF MLB
CANDIDATE SLAVE UNIT A	3	○	×
CANDIDATE SLAVE UNIT B	2	×	×
CANDIDATE SLAVE UNIT C	4	○	○
CANDIDATE SLAVE UNIT D	1	×	×

FIG.28

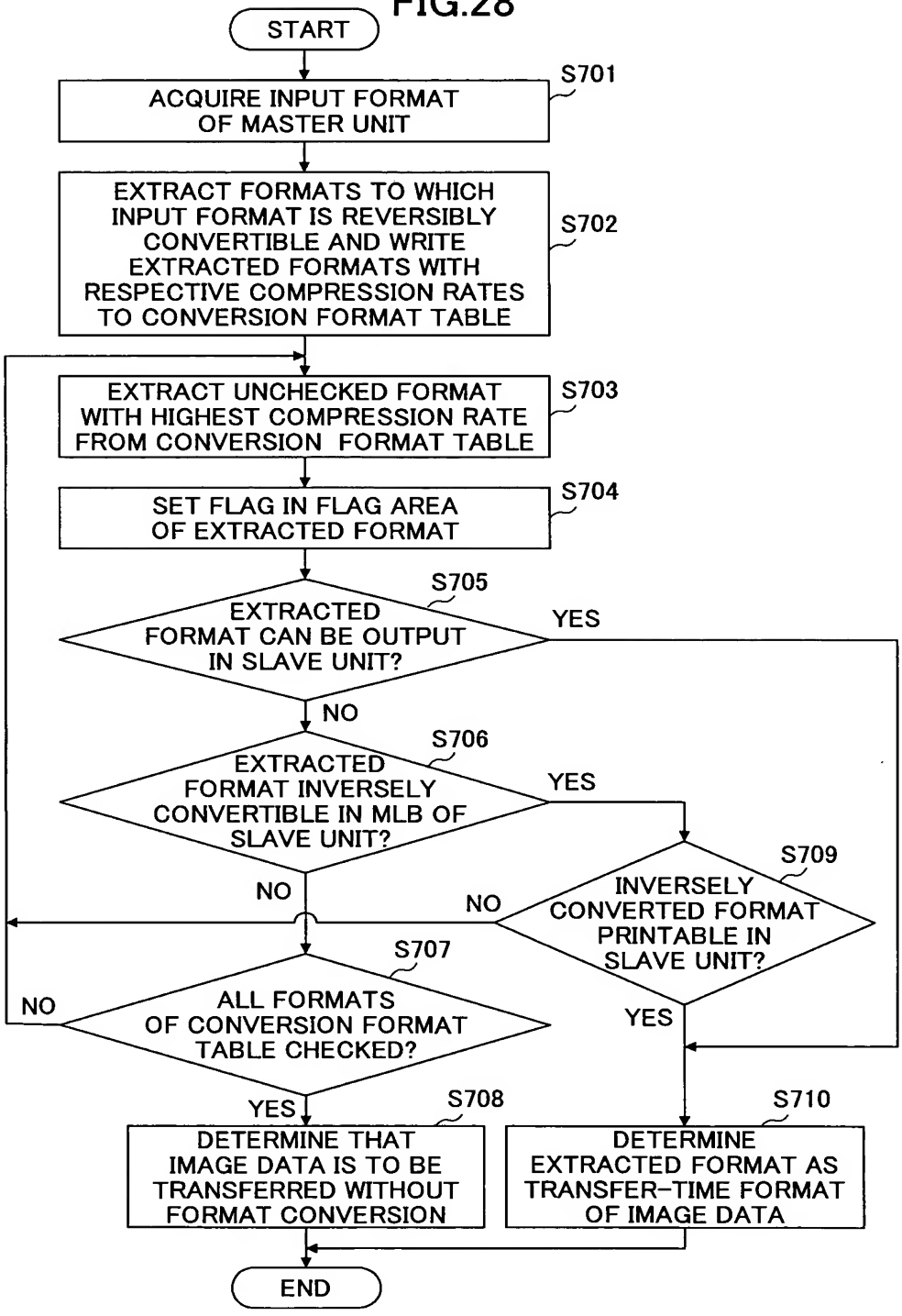

START
ACQUIRE INPUT FORMAT OF MASTER UNIT
S701
EXTRACT FORMATS TO WHICH INPUT FORMAT IS REVERSIBLY CONVERTIBLE AND WRITE EXTRACTED FORMATS WITH RESPECTIVE COMPRESSION RATES TO CONVERSION FORMAT TABLE
S702
EXTRACT UNCHECKED FORMAT WITH HIGHEST COMPRESSION RATE FROM CONVERSION FORMAT TABLE
S703
SET FLAG IN FLAG AREA OF EXTRACTED FORMAT
S704
EXTRACTED FORMAT CAN BE OUTPUT IN SLAVE UNIT?
S705
YES
NO
EXTRACTED FORMAT INVERSELY CONVERTIBLE IN MLB OF SLAVE UNIT?
S706
YES
NO
INVERSELY CONVERTED FORMAT PRINTABLE IN SLAVE UNIT?
S709
NO
YES
ALL FORMATS OF CONVERSION FORMAT TABLE CHECKED?
S707
NO
YES
DETERMINE THAT IMAGE DATA IS TO BE TRANSFERRED WITHOUT FORMAT CONVERSION
S708
DETERMINE EXTRACTED FORMAT AS TRANSFER-TIME FORMAT OF IMAGE DATA
S710
END

FIG.29

CONVERSION FORMAT TABLE		
FORMAT	A	C
COMPRESSION RATE	0.9	0.8
FLAG		

FIG.30

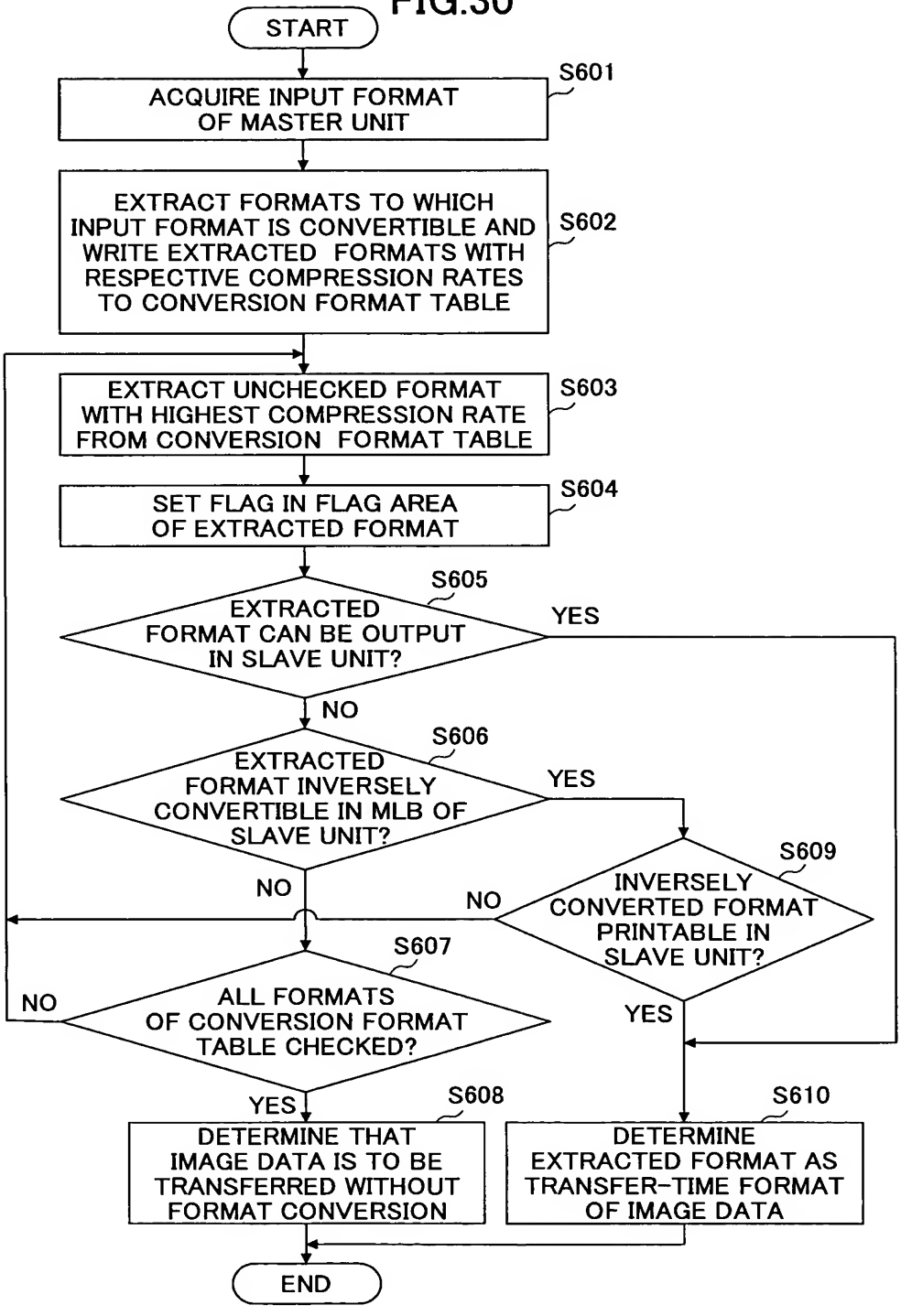

START
ACQUIRE INPUT FORMAT OF MASTER UNIT
S601
EXTRACT FORMATS TO WHICH INPUT FORMAT IS CONVERTIBLE AND WRITE EXTRACTED FORMATS WITH RESPECTIVE COMPRESSION RATES TO CONVERSION FORMAT TABLE
S602
EXTRACT UNCHECKED FORMAT WITH HIGHEST COMPRESSION RATE FROM CONVERSION FORMAT TABLE
S603
SET FLAG IN FLAG AREA OF EXTRACTED FORMAT
S604
EXTRACTED FORMAT CAN BE OUTPUT IN SLAVE UNIT?
S605
YES
NO
EXTRACTED FORMAT INVERSELY CONVERTIBLE IN MLB OF SLAVE UNIT?
S606
YES
NO
INVERSELY CONVERTED FORMAT PRINTABLE IN SLAVE UNIT?
S609
NO
YES
ALL FORMATS OF CONVERSION FORMAT TABLE CHECKED?
S607
NO
YES
DETERMINE THAT IMAGE DATA IS TO BE TRANSFERRED WITHOUT FORMAT CONVERSION
S608
DETERMINE EXTRACTED FORMAT AS TRANSFER-TIME FORMAT OF IMAGE DATA
S610
END

FIG.31

CONVERSION FORMAT TABLE			
FORMAT	A	C	D
COMPRESSION RATE	0.9	0.8	0.7
FLAG			

FIG.32

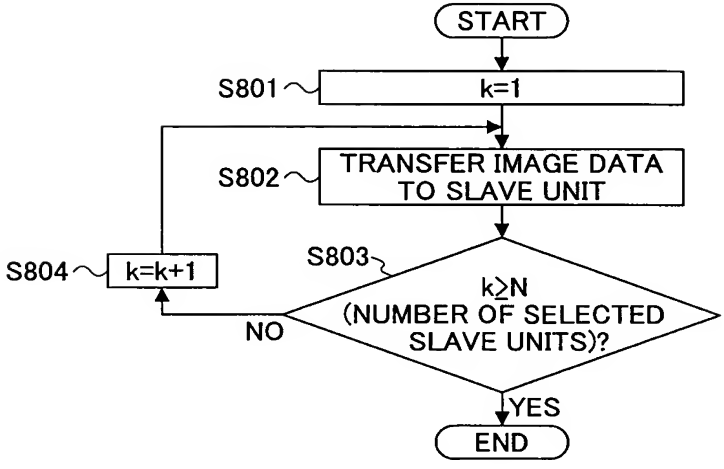

START
S801
k=1
S802
TRANSFER IMAGE DATA TO SLAVE UNIT
S803
k≥N (NUMBER OF SELECTED SLAVE UNITS)?
NO
S804
k=k+1
YES
END

FIG.33

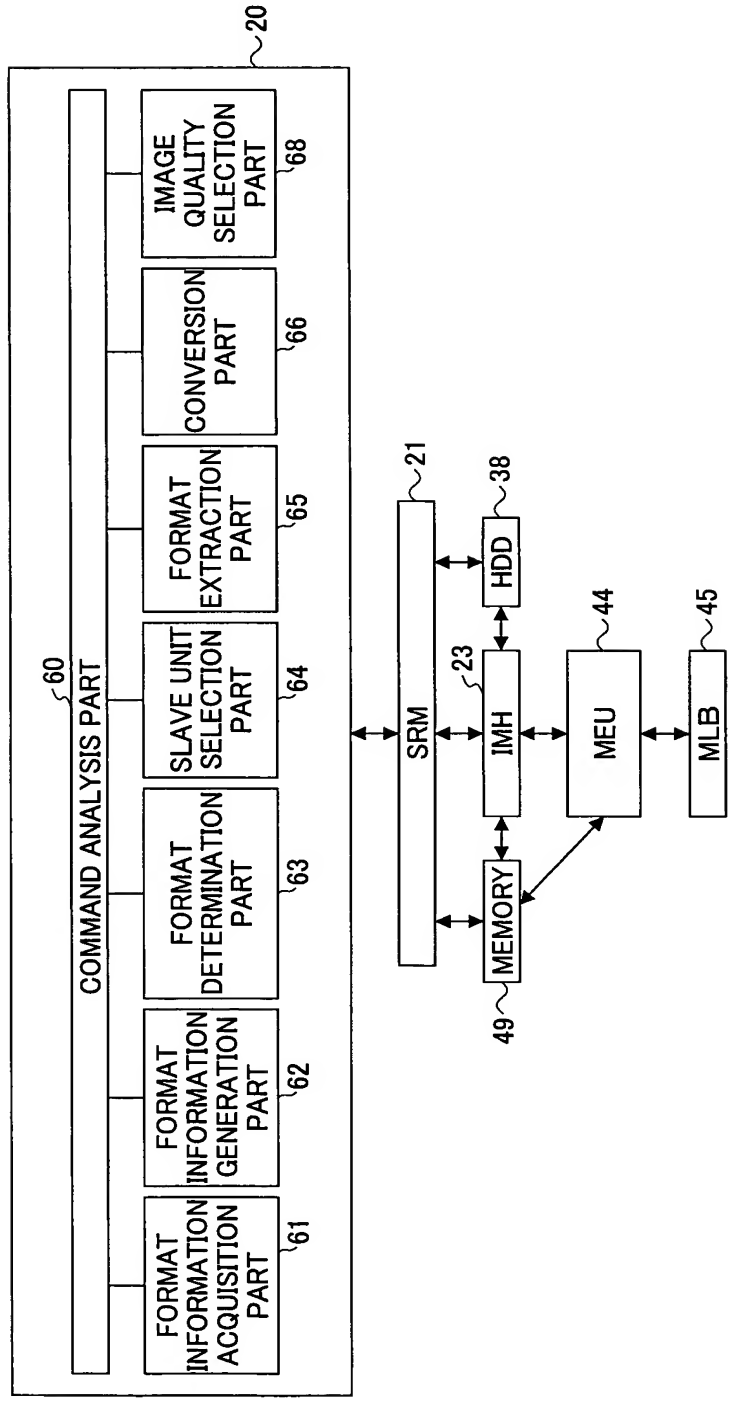

20
60
COMMAND ANALYSIS PART
FORMAT INFORMATION ACQUISITION PART
61
FORMAT INFORMATION GENERATION PART
62
FORMAT DETERMINATION PART
63
SLAVE UNIT SELECTION PART
64
FORMAT EXTRACTION PART
65
CONVERSION PART
66
IMAGE QUALITY SELECTION PART
68
21
SRM
23
IMH
38
HDD
44
MEU
45
MLB
49
MEMORY

FIG.34

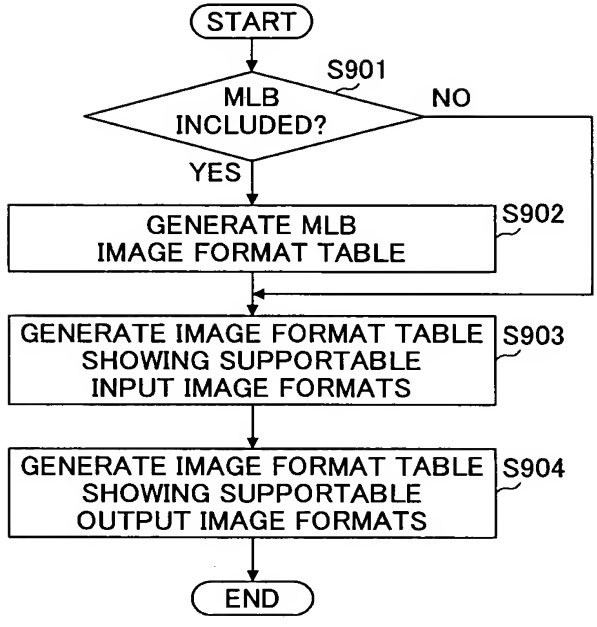

START
S901
MLB INCLUDED?
NO
YES
GENERATE MLB IMAGE FORMAT TABLE
S902
GENERATE IMAGE FORMAT TABLE SHOWING SUPPORTABLE INPUT IMAGE FORMATS
S903
GENERATE IMAGE FORMAT TABLE SHOWING SUPPORTABLE OUTPUT IMAGE FORMATS
S904
END

FIG.35

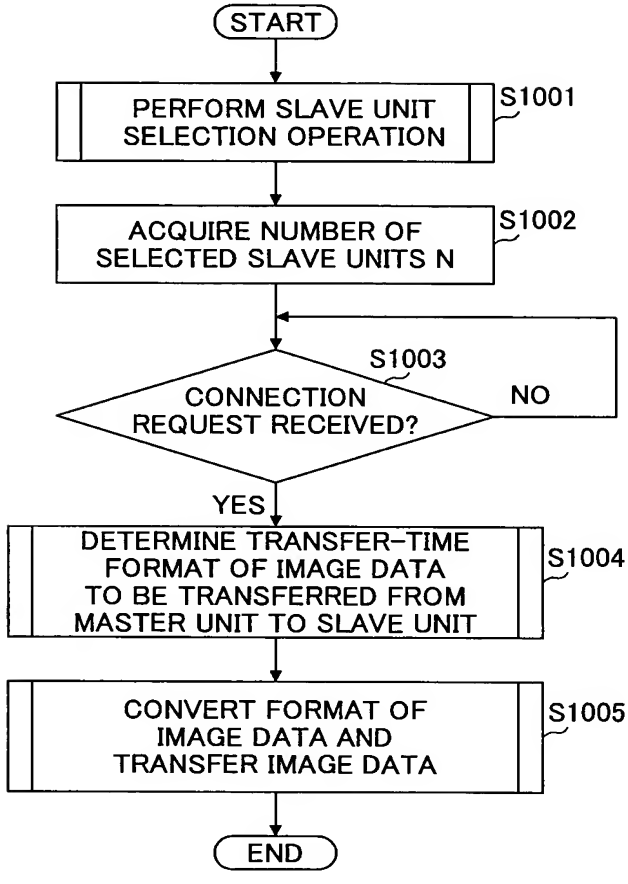

START
PERFORM SLAVE UNIT SELECTION OPERATION
S1001
ACQUIRE NUMBER OF SELECTED SLAVE UNITS N
S1002
S1003
CONNECTION REQUEST RECEIVED?
NO
YES
DETERMINE TRANSFER-TIME FORMAT OF IMAGE DATA TO BE TRANSFERRED FROM MASTER UNIT TO SLAVE UNIT
S1004
CONVERT FORMAT OF IMAGE DATA AND TRANSFER IMAGE DATA
S1005
END

FIG.36

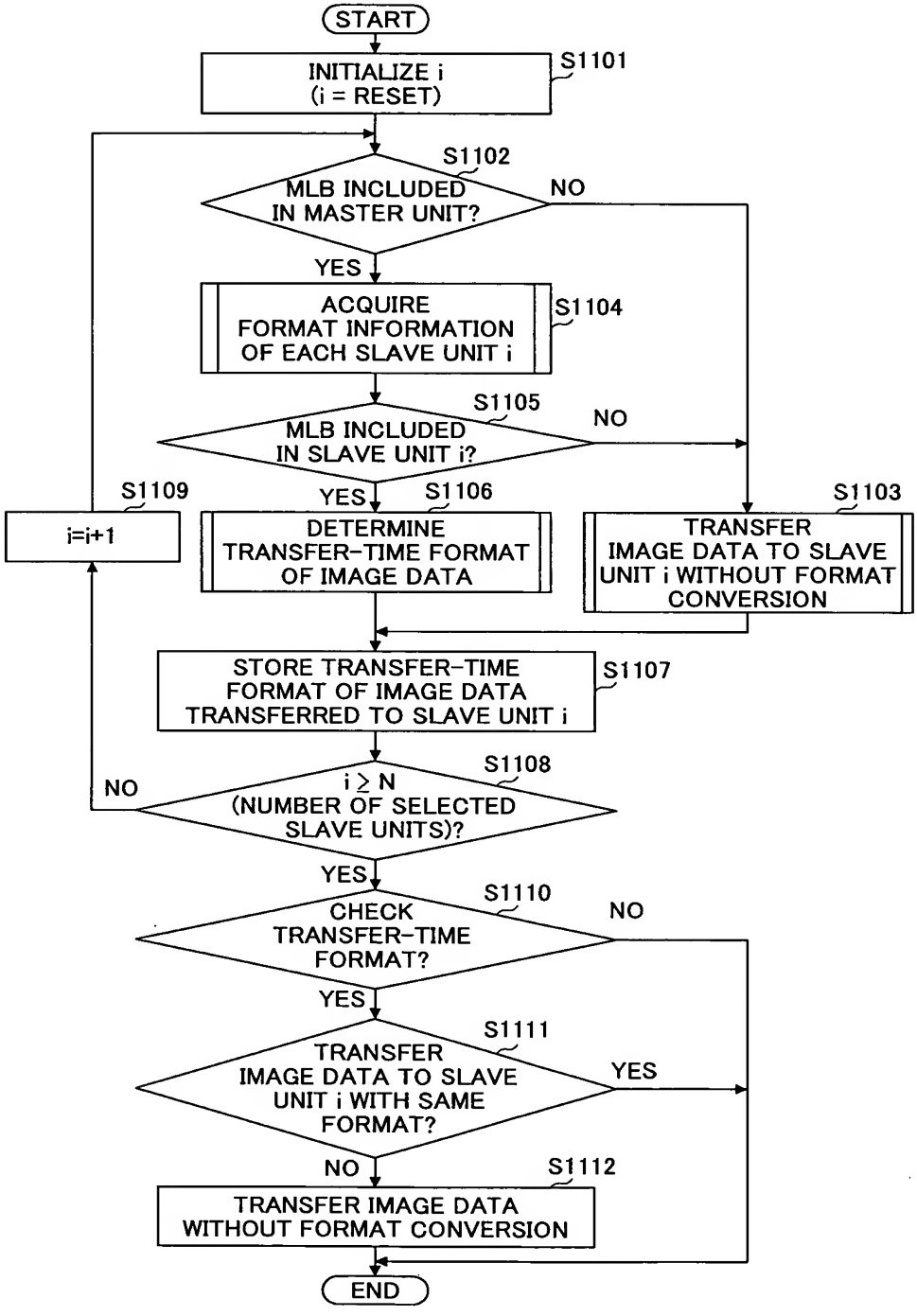

START
INITIALIZE i
(i = RESET)
S1101
S1102
MLB INCLUDED IN MASTER UNIT?
NO
YES
ACQUIRE FORMAT INFORMATION OF EACH SLAVE UNIT i
S1104
S1105
MLB INCLUDED IN SLAVE UNIT i?
NO
YES
S1106
DETERMINE TRANSFER-TIME FORMAT OF IMAGE DATA
S1103
TRANSFER IMAGE DATA TO SLAVE UNIT i WITHOUT FORMAT CONVERSION
S1109
i=i+1
STORE TRANSFER-TIME FORMAT OF IMAGE DATA TRANSFERRED TO SLAVE UNIT i
S1107
S1108
i ≥ N (NUMBER OF SELECTED SLAVE UNITS)?
NO
YES
S1110
CHECK TRANSFER-TIME FORMAT?
NO
YES
S1111
TRANSFER IMAGE DATA TO SLAVE UNIT i WITH SAME FORMAT?
YES
NO
S1112
TRANSFER IMAGE DATA WITHOUT FORMAT CONVERSION
END

FIG.37

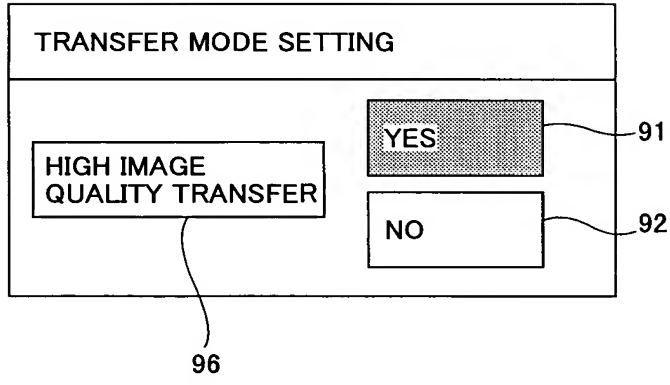
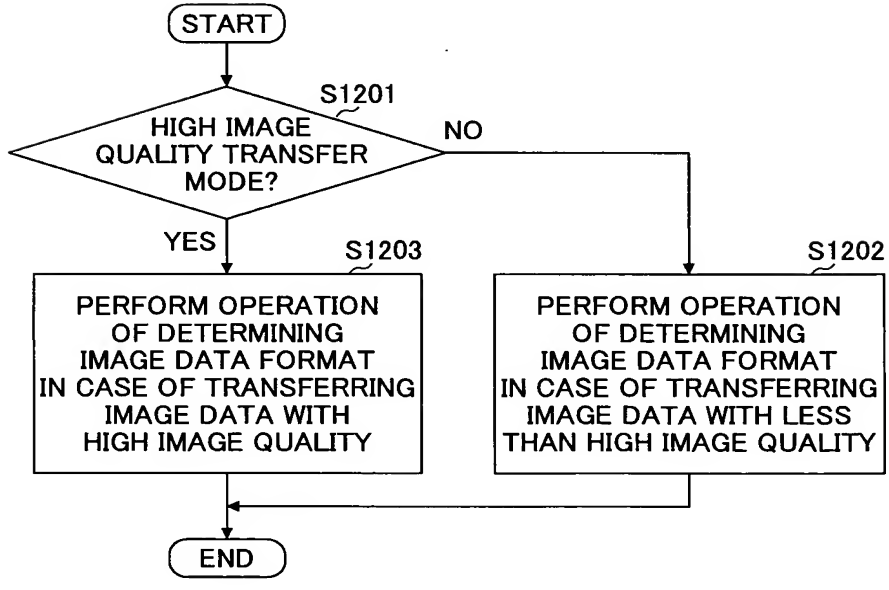

TRANSFER MODE SETTING
YES
91
HIGH IMAGE QUALITY TRANSFER
NO
92
96

FIG.38


START
S1201
HIGH IMAGE QUALITY TRANSFER MODE?
NO
YES
S1203
S1202
PERFORM OPERATION OF DETERMINING IMAGE DATA FORMAT IN CASE OF TRANSFERRING IMAGE DATA WITH HIGH IMAGE QUALITY
PERFORM OPERATION OF DETERMINING IMAGE DATA FORMAT IN CASE OF TRANSFERRING IMAGE DATA WITH LESS THAN HIGH IMAGE QUALITY
END